



**Zakład Mechaniki i Elektroniki  
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# zAMEL

### DESCRIPTION

The CKM-01 phase sequence sensor device is used to protect devices powered from a three-phase installation (e.g. a motor) from being damaged in case of phase voltage switch off. It is because of phase voltage asymmetry or wrong phase sequence. The threshold switch on value is can be adjusted by the user by means of a potentiometer. The system does not protect from voltage drop asymmetry and it is powered from L1 phase. The switch off delay and voltage hysteresis cause the system is resistant to momentary voltage changes.

### FEATURES

- ⤵ Wrong phase sequence protection,
- ⤵ phase fading protection,
- ⤵ voltage asymmetry protection,
- ⤵ (asymmetry) switch on threshold regulation,
- ⤵ switch off delay and voltage hysteresis
- ⤵ resistant to momentary voltage drops,
- ⤵ momentary voltage fading protection max 10 A capacity,
- ⤵ monomodular casing,
- ⤵ TH-35 DIN rail installation.

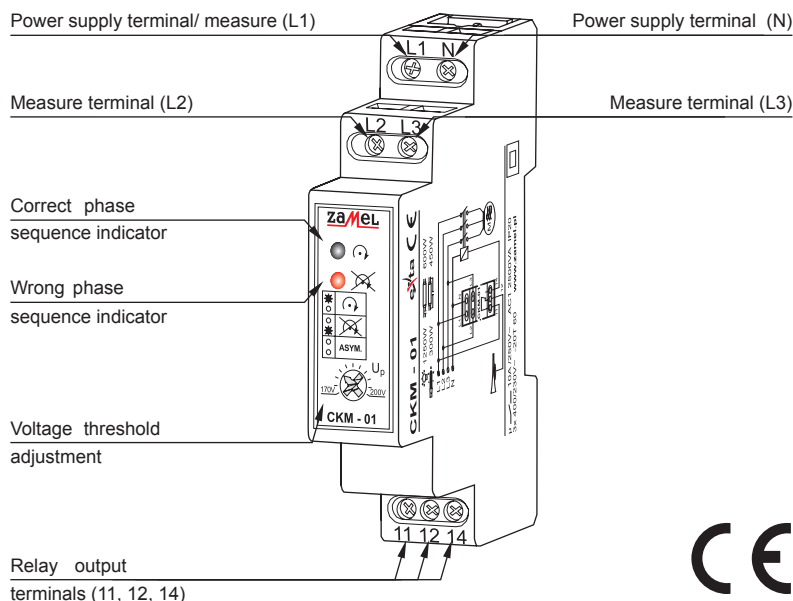


The device is designed for three-phase installation and must be installed in accordance with standards valid in a particular country. The device should be connected according to the details included in this operating manual. Installation, connection and control should be carried out by a qualified electrician staff, who act in accordance with the service manual and the device functions. Disassembling of the device is equal with a loss of guarantee and can cause electric shock. Before installation make sure the connection cables are not under voltage. The cruciform head screwdriver 3,5 mm should be used to instal the device. Improper transport, storage, and use of the device influence its wrong functioning. It is not advisable to instal the device in the following cases: if any device part is missing or the device is damaged or deformed. In case of improper functioning of the device contact the producer.

### TECHNICAL PARAMETERS

CKM - 01	
Supply cables:	L1, N
Input rated voltage / supervised:	230/400 V~
Rated current:	from -15 to +10 %
Rated frequency:	50 / 60 Hz
Znamionowy pobór prądu:	34 mA
Measure terminals:	L1, L2, L3
Correct phase sequence indicator:	LED green
Wrong phase sequence indicator:	LED red
Voltage threshold adjustment:	170 V + 200 V
Voltage hysteresis:	approx. 10 V
Switch on delay $t_1$ :	5 sec - 10 sec
Switch off delay $t_2$ :	1sec - 5 sec
Output relay parameters:	1NO/NC - 10 A / 250 V AC1 2500 VA
Number of terminal clamps:	7
Section of connecting cables:	from 0,2 to 2,50 mm <sup>2</sup>
Ambient temperature range:	from -20 to +60 °C
Operating position:	free
Mounting:	TH35 rail (PN-EN 60715)
Protection degree:	IP20 (PN-EN 60529)
Protection class:	II
Overvoltage category:	II
Pollution degree:	2
Rated impulse withstand voltage:	2 kV (PN-EN 61000-4-5)
Dimensions:	monomodular (17,5 mm) 90x17,5x66 mm
Weight:	77 g
Reference standards:	PN-EN 60730-1; PN-EN 60730-2-1 PN-EN 61000-4-2,3,4,5,6,11

### APPEARANCE

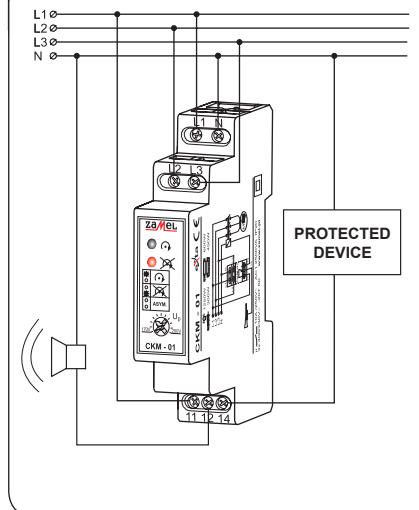


## MOUNTING, FUNCTIONING

1. Disconnect the power supply from the mains by the phase fuse, the circuit-breaker or the switch-disconnector that are joined to the proper circuit,
2. **Check if there is no voltage on connection cables by means of a special measure equipment,**
3. Install CKM-01 device in the switchboard on TH-35 DIN rail,
4. Connect the cables with the terminals according to installing diagram,
5. Switch on the power supply from the mains,
6. Adjust voltage threshold that switches on phase sequence sensor.

After power supply has been applied (from L1 phase) the sensor controls the correct phase order. In case there is a wrong phase sequence, the LED red switches on marked „X” (outputs 11–12 are closed, the motor is switched off, the alarm is switched on). The LED green switches on in case of a correct phase sequence „O” (outputs 11–14 are closed, the motor is switched on) and the sensor controls voltage values in particular phase. The relay remains in on position and the controlled load (e.g. motor) is switched on till the voltage value is correct in every phase. In case there is a lack of any of the phases or there is a voltage drop below the adjusted asymmetry threshold the relay is switched off. There is a short time delay in switching off the relay ( $t_2$  from 1 to 5 sec). The device is resistant to momentary voltage drops. Another motor switch on follows (outputs 11–14 are closed) when the voltage is 10 V higher from the adjusted voltage threshold (voltage hysteresis), and after  $t_1$  time (from 5 sec to 10 sec) is over. LED diodes are switched on till every phase voltage is below 50 V.

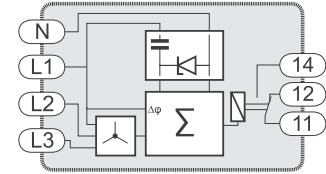
## CONNECTING



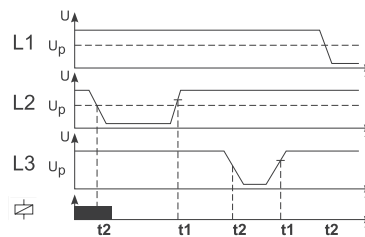
## WARNING!

The relay system is powered from L1 phase. The relay switch off time delay depends on output power connected to a three-phase installation. The lack of two phases causes the sensor to switch on.

## INNER DIAGRAM



## TIME COURSE



## SIGNALLING

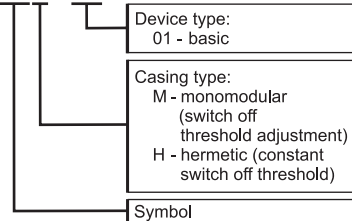
### SIGNALLING

O	VOLTAGE ASYMMETRY
X	CORRECT PHASE SEQUENCE INDICATOR
O	WRONG PHASE SEQUENCE INDICATOR

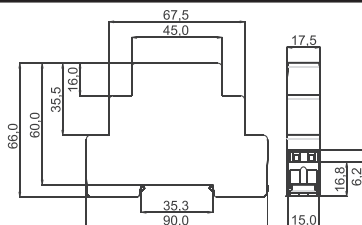
## PRODUCT FAMILY

CKM-01 phase sequence sensor belongs to CKX asymmetry sensor family.

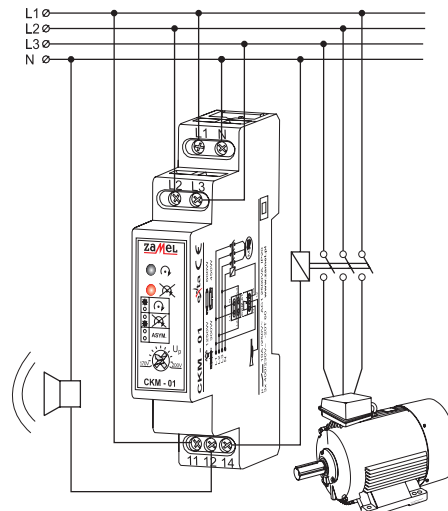
### CKX - xx



## DIMENSIONS



## EXAMPLE OF INSTALLATION



The phase sequence sensor protects the motor does not work in case of supply failure. The sensor enables the motor to work only when there is a correct phase sequences.

## GUARANTEE CARD

There is 24 months guarantee on the product

Salesman stamp and signature, date of sale

1. ZAMEL provides a two-year warranty for its products.
2. The ZAMEL warranty does not cover:
  - a) mechanical defects resulting from transport, loading / unloading or other circumstances,
  - b) defects resulting from incorrect installation or operation of ZAMEL products,
  - c) defects resulting from any changes made by CUSTOMERS or third parties, to products sold or equipment necessary for the correct operation of products sold,
  - d) defects resulting from force majeure or other aleatory events for which ZAMEL is not liable.
3. All complaints in relation to the warranty must be provided by the CUSTOMER in writing to the retailer after discovering a defect.
4. ZAMEL will review complaints in accordance with existing regulations.
5. The way a complaint is settled, e.g. replacement of the product, repair or refund, is left to the discretion of ZAMEL.